CHANGING IN ENERGY COST AND STRIDE PARAMETERS DURING A LONG DISTANCE EXERCISE IN RUNNING

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Introduction

In running, biomechanical and physiological parameters change during the exercice (Candau et al., 1998 ; Hunter et Smith, 2007). But the relationship between these two categories of changes are not well known (Avogadro et al., 2003). Therefore, the aim of this study was to analyse relationship between changes in both energy cost (EC) and stride parameters (SP) during a long distance run.

Methods

15 male athletes (age : 34 ± 9 years old ; VO2max : 62 ± 5 mlO2/min/kg ; MAS : 18,9 ± 0,8 km/h) realized a maximal effort test and, within 7±2 days, an exhaustive submaximal run at 80% of their maximal aerobic speed (MAS) on a treadmill. During this test, SP (contact time (CT), aerial time (AT), stride lenght (SL) and stride frequency (SF)), with Optojump Next system (Microgate), and physiological parameters (heart rate, lactate concentration, EC (from oxygen consumption)), were measured each five minutes from the start to the end of the exercice.

Results

During the run at 80% of VO2max (15,1 ± 0,5km/h ; time : 87 ± 25 min ; distance : 21 ± 6km), as regards biomechanical parameters, only CT increased significantly (from 0,208 ± 0,02 ms at the beginning to 0,214 ± 0,02 ms at the exhaustion) during the exercice ($p<0,05$). The other SP didn't show any significant change during the submaximal test even if AT and SF tend to decrease while the SL tends to increase. As regards physiological parameters, only heart rate increases significantly (from 84% to 93% of maximum heart rate) while lactate concentration, EC, and therefore, oxygen consuption, increase but not significantly. No correlation have been found between SP and EC.

Discussion

The aim was to study the relationship between changes in the SP and the EC during a long distance exercice in running. We could hypothesize that fatigue generated by the intensity of the exercice could change the SP and thus, induce an CE increase. However, no correlation could be demonstrated. The disparity of results reflects the complexity of the influence of SP on RE. It would be interesting to further study by EMG analysis, especially during the phase of flight. This phase seems to have an influence on the energy cost (Santos-Concejero et al., 2014).

References

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